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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,222	03/23/2004	Alex Kuo	2019-0241PUS1	1718

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EXAMINER	
MISLEH, JUSTIN P	

ART UNIT	PAPER NUMBER
2622	

NOTIFICATION DATE	DELIVERY MODE
05/21/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/806,222	Applicant(s) KUO ET AL.
	Examiner Justin P. Misleh	Art Unit 2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 March 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 - 15 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 - 15 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 March 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: minor typographical error.

On page 9 (line 5) of the specification, "D12" should be changed to "D2". "D12" appears to be a typographical error. **Appropriate correction is required.**

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1 – 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Conceded Prior Art (herein referred to as ACPA) in view of Shiozawa (US 6,046,525).

4. For **Claim 1**, ACPA discloses, as shown in figures 1 and 2 and as stated on page 1 (line 9) – page 4 (line 8) of the present application, a piezoelectric focusing method (see page 1, lines 13 – 17), a piezoelectric material ("piezoelectric ceramic") being controlled to adjust a distance between a lens unit and an electronic imaging device (see page 3, lines 7 – 10 and 13 – 15), the method comprising the steps of:

constructing a first table ("the conventional technology ... must prepare two sets of deformation-voltage lookup table") associated with an increased voltage ("one of which is used for expansion condition (voltage increasing control)"; see page 3, lines 9 – 15) and a second table ("the conventional technology ... must prepare two sets of deformation-voltage lookup table") associated with a decreased voltage for the piezoelectric material ("the other of which is used for shrinkage condition (voltage decreasing control)"; see page 3, lines 9 – 15); and

supplying a voltage ("driven by a voltage") to the piezoelectric material ("piezoelectric ceramic") according to the first and second tables deformation tables ("two sets of deformation-voltage lookup table") for generating a desired deformation "(deformation D1" to "deformation D2" and vice versa) and controlling a focusing distance between the lens unit and the electronic imaging device (see page 2, lines 3 – 10; page 3, lines 13 – 15; and page 4, lines 2 – 8).

The Examiner notes ACPA discloses that the piezoelectric ceramic has a hysteretic response curve (see page 3, lines 16 and 17), which causes expansion of the piezoelectric material along curve C (see figure 1A) and also causes shrinking of the piezoelectric material along curve D (see figure 1B). ACPA states, "the conventional piezoelectric [apparatus] spend much time in the procedures and thus, cannot [operate] quickly" (see page 3, lines 6 – 8).

However, ACPA does not disclose constructing a bi-directional deformation table by associating voltages in the first table and the second table corresponding to a deformation; and supplying a voltage to the piezoelectric material according to the bi-directional deformation table for generating a desired deformation.

On the other hand, Shiozawa analogously discloses using a piezoelectric actuator in an optical system and a corresponding method for controlling the same. More specifically,

Shiozawa shows, in figures 1 and 4 and as stated in column 2 (line 64) – column 3 (line 10) and column 3 (line 56) – column 4 (line 14), and optical system having a piezoelectric actuator (101/201a) that is driven by a high voltage driver (102/202) in response to controls from the controller (103/203) and memory (104/204). Shiozawa further teaches, as stated in column 3 (lines 11 – 24), that the piezoelectric actuator (201a) is formed from piezoelectric material having a hysteresis characteristic (see figure 2) wherein increasing the voltage supplied to the piezoelectric material causes the material to deform from displacement point A to displacement point B (e.g., along curve D) and decreasing the voltage supplied to the piezoelectric material causes the material to deform from displacement point B to displacement point A (e.g., along curve C). Finally, to compensate for the hystersis characteristic of the piezoelectric material, Shiozawa constructs a bi-directional deformation table in the memory (104) by associating voltages along the first curve from point A to B and along the second curve from point B to A and supplying a voltage to the piezoelectric material according to the bi-directional deformation table for generating a desired deformation (see column 3, lines 6 – 56).

Hence, at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have constructed a bi-directional deformation table according to the hysteresis curve of the piezoelectric material and supplying a driving voltage to the piezoelectric material according to the information in the table, as taught by Shiozawa, in the piezoelectric focusing method, disclosed by ACPA, for the advantage of *eliminating the adverse effect of residual hysteresis and controlling the displacement accurately; thus, the piezoelectric actuator is controlled easily and consistently to a prescribed displacement* (see Shiozawa; column 5, lines 5 – 9).

5. As for **Claim 2**, ACPA and Shiozawa both disclose wherein the piezoelectric material is a deformable material with hysteretic characteristic (see ACPA, page 3, lines 16 and 17; see Shiozawa, column 3, lines 11 – 14).

6. As for **Claim 3**, ACPA discloses wherein the piezoelectric material is expanded or shrunk according to an applied voltage thereon (see ACPA, page 3, lines 9 – 15).

7. As for **Claim 4**, ACPA discloses wherein the electronic imaging device is a CCD (charge coupled device) or a CMOS sensor (see page 1, lines 13 – 17).

8. As for **Claim 5**, ACPA discloses, as shown in figure 1A, wherein the step of constructing the first table is performed by increasing a supplied voltage from one associated with a minimal deformation to another associated with a maximal deformation (see page 2, line 20 – page 3, line 3 and page 3, lines 9 – 15).

9. As for **Claim 6**, ACPA discloses, as shown in figure 1B, wherein the step of constructing a second table is performed by decreasing a supplied voltage from one associated with a maximal deformation to another associated with a minimal deformation (see page 3, lines 3 – 15).

10. As for **Claim 7**, Shiozawa further teaches, as shown in figure 2, wherein the step of constructing the bi-directional deformation table is performed by associating voltages on the first table ("control voltage E") related to an expanding operation (at displacement point D) and the second table related to a shrinking operation ("control voltage E") corresponding to a same deformation (at displacement point C).

Shiozawa provides a control method that allows the piezoelectric actuator, during a controlling operation, to be driven only twice. The table based upon figure 2 and stored in

memory (104) allows Shiozawa to first drive the piezoelectric actuator to at least one of the initial displacement positions (either displacement point A or displacement B) and then to a prescribed displacement point along either curve (see the method of figure 3 and column 3, lines 36 – 56). In other words, using the control method of Shiozawa the piezoelectric actuator would never be driven to both initial displacement point A and initial displacement point B in the same operation.

11. As for **Claim 8**, Shiozawa teaches, as stated in column 3 (lines 6 - 56), after the step of constructing the bi-directional deformation table, comprising a step of storing the bi-directional deformation table (in memory 104/204; see figure 2).

12. As for **Claim 9**, ACPA discloses that the supplied voltages are for expanding and shrinking the piezoelectric material (see page 2, line 20 – page 3, line 8). Shiozawa further teaches, as shown in figure 3 and as stated in column 3 (lines 36 – 56), supplying a voltage according to the bi-directional deformation table. For the reasons given above with respect to Claim 1, at the time the invention was made, it would have been obvious to one with ordinary skill in the art to combine the two teachings.

13. For **Claim 10**, ACPA discloses, as shown in figures 1 and 2 and as stated on page 1 (line 9) – page 4 (line 8) of the present application, a piezoelectric focusing apparatus, comprising:

an electronic imaging device (not specifically shown; however, necessary for proper operation; see page 1, lines 13 – 17);

at least one lens arranged on one side of the electronic imaging device (not specifically shown; however, necessary for proper operation; see page 1, lines 18 – page 2, lines 10);

a piezoelectric material (not shown; although identified as "piezoelectric ceramic") placed between the lens and the electronic imaging device and used for adjusting a distance between the lens unit and the electronic imaging device (see page 2, lines 3 – 10 and page 3, lines 9 – 15); and

a controller (not specifically shown; however, necessary for proper operation) electrically connected to the piezoelectric material and having a built-in-deformation tables ("two sets of deformation-voltage lookup table"; see page 3, lines 9 – 15), the controller supplying a voltage to the piezoelectric material according to the deformation table for generating a desired deformation and controlling a focusing distance between the lens unit and the electronic imaging device. (see page 3,lines 9 – 15 and page 4, lines 2 – 8).

The Examiner notes ACPA discloses that the piezoelectric ceramic has a hysteretic response curve (see page 3, lines 16 and 17), which causes expansion of the piezoelectric material along curve C (see figure 1A) and also causes shrinking of the piezoelectric material along curve D (see figure 1B). ACPA states, "the conventional piezoelectric [apparatus] spend much time in the procedures and thus, cannot [operate] quickly" (see page 3, lines 6 – 8).

However, ACPA does not disclose <u>a bi-directional deformation table</u> which associates voltages in the first table and the second table corresponding to a deformation; and <u>supplying a voltage</u> to the piezoelectric material <u>according to the bi-directional deformation table</u> for generating a desired deformation.

On the other hand, Shiozawa analogously discloses using a piezoelectric actuator in an optical system and a corresponding method for controlling the same. More specifically, Shiozawa shows, in figures 1 and 4 and as stated in column 2 (line 64) – column 3 (line 10) and

column 3 (line 56) – column 4 (line 14), and optical system having a piezoelectric actuator (101/201a) that is driven by a high voltage driver (102/202) in response to controls from the controller (103/203) and memory (104/204). Shiozawa further teaches, as stated in column 3 (lines 11 – 24), that the piezoelectric actuator (201a) is formed from piezoelectric material having a hysteresis characteristic (see figure 2) wherein increasing the voltage supplied to the piezoelectric material causes the material to deform from displacement point A to displacement point B (e.g., along curve D) and decreasing the voltage supplied to the piezoelectric material causes the material to deform from displacement point B to displacement point A (e.g., along curve C). Finally, to compensate for the hystersis characteristic of the piezoelectric material, Shiozawa constructs a bi-directional deformation table in the memory (104) by associating voltages along the first curve from point A to B and along the second curve from point B to A and supplying a voltage to the piezoelectric material according to the bi-directional deformation table for generating a desired deformation (see column 3, lines 6 – 56).

Hence, at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have included a bi-directional deformation table according to the hysteresis curve of the piezoelectric material and supplying a driving voltage to the piezoelectric material according to the information in the table, as taught by Shiozawa, in the piezoelectric focusing method, disclosed by ACPA, for the advantage of *eliminating the adverse effect of residual hysteresis and controlling the displacement accurately; thus, the piezoelectric actuator is controlled easily and consistently to a prescribed displacement* (see Shiozawa; column 5, lines 5 – 9).

14. As for **Claim 11**, ACPA discloses wherein the electronic imaging device is a CCD (charge coupled device) or a CMOS sensor (see page 1, lines 13 – 17).

15. As for **Claim 12**, ACPA and Shiozawa both disclose wherein the piezoelectric material is a deformable material with hysteretic characteristic (see ACPA, page 3, lines 16 and 17; see Shiozawa, column 3, lines 11 – 14).

16. As for **Claim 13**, ACPA discloses that the supplied voltages are for expanding and shrinking the piezoelectric material (see page 2, line 20 – page 3, line 8). Therefore, ACPA discloses wherein the piezoelectric material is expanded or shrunk according to voltage applied thereon.

17. As for **Claim 14**, Shiozawa further teaches, as shown in figure 2, wherein the bi-directional deformation table is constructed by associating voltages on the first table ("control voltage E") related to an expanding operation (at displacement point D) and the second table related to a shrinking operation ("control voltage E") corresponding to a same deformation (at displacement point C).

Shiozawa provides a control method that allows the piezoelectric actuator, during a controlling operation, to be <u>driven only twice</u>. The table based upon figure 2 and stored in memory (104) allows Shiozawa to first drive the piezoelectric actuator to <u>at least one</u> of the initial displacement positions (either displacement point A or displacement B) and then to a prescribed displacement point along either curve (see the method of figure 3 and column 3, lines 36 – 56). In other words, using the control method of Shiozawa the piezoelectric actuator would never be driven to both initial displacement point A and initial displacement point B in the same operation.

18. As for **Claim 15**, Shiozawa discloses, as shown in figures 1 and 2, a storage unit (memory 104/204) electrically connected to the controller (103/203) and used for storing the bi-directional deformation table (see column 3, lines 6 – 56).

Cited Prior Art

19. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure for the following reason(s):

Kitazawa et al. (US 6,067,421) discloses a camera apparatus with a piezoelectric focusing device and a corresponding method of operating thereof, wherein a memory associated with a drive control unit for the piezoelectric device stores voltages and corresponding piezoelectric displacements.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 571.272.7313. The Examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Vivek Srivastava can be reached on 571.272.7304. The fax phone number for the organization where this application or proceeding is assigned is 571.273.8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Justin Misleh
Examiner, GAU 2622
May 14, 2007